

Hobbies

WEEKLY

CONTENTS

	Page
Air Rifle Target	- 353
Sunken Garden	- 355
Handy Kitchen Unit	- 356
Artist's Paint Box	- 357
Screen Grid Three	- 358
Readers' Problems	- 359
Home Punch Ball	- 360
Garden Tool Shed	- 361
Home Chemistry	- 363
Building Bricks	- 364
Stamp Collecting	- 365

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A SIMPLE ELECTRIC AIR RIFLE TARGET

MANY boys living in the city are denied the joy of having a 'pot-shot' with an airgun because of the difficulty of ricochetting bullets in such thickly populated areas. In the country, of course, things are different. Sparrows abound in the farmyards, eating valuable corn, and the farmers are only too pleased to be rid of them.

Even so, the little 'safety' target shown here will be very useful for practise shots. It will entirely eliminate the danger of 'ricochets', and obviate the necessity for paying for an occasional broken window or dead chicken.

The Bullet Catcher

The sketches on these pages show

how to make a bullet catcher which will answer the purpose of both city and country dweller admirably. It will take two targets at once, so when two are shooting, each can use a target and compare scores afterwards.

Targets for 25yds. distance are usually about 6ins. square, with an actual target area of 4½ins. diameter. The targets can be bought from most local ironmongers, who usually stock guns and their accessories. Small drawing pins should be used for fixing to the front of the box.

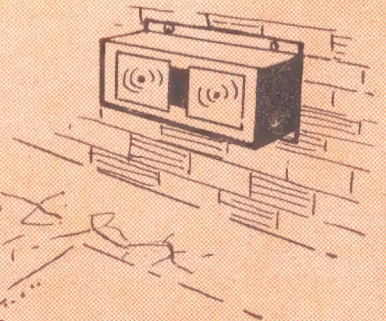
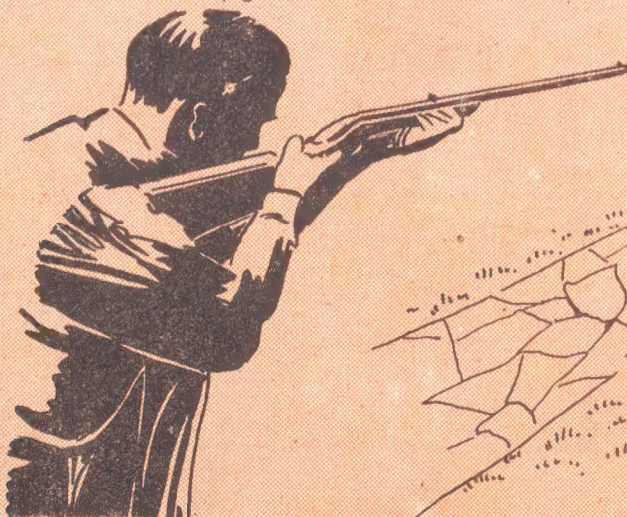
The box is designed to hang on a wall or shed and is made up of ½in. wood. The kind of wood does not really matter and the choice is, therefore, left to the

reader. It is possible that a box from the grocer may be adapted to suit.

The section in Fig. 1 and the cut-away view in Fig. 2 show enough of the construction to enable you to commence work. The front piece measures 16½ins. long and is 9ins. wide. An opening 13½ins. by 5½ins. is cut in with a fretsaw. Mark out the opening, drill a hole in one corner and insert the fretsaw blade in the normal manner.

Constructing the Box

For the main part of the box two pieces 16½ins. by 8ins. and two 8ins. square are butted together, as shown.



A safe target arrangement for the amateur rifleman in the garden

Screws should be used in preference to glue or nails for fixing, since the box will have to stand the weather as well as a good deal of knocking about. The cut-out front can now be screwed securely in place and the back cut out.

You will see in the diagrams that the back is not shaped, but is simply a piece of $\frac{1}{2}$ in. wood measuring $16\frac{1}{2}$ ins. by 11 ins. You could, of course, make up the width of 11 ins. by using two narrower boards.

The Armoured Interior

The 'armour' inside consists of a piece of $\frac{1}{8}$ in. sheet metal bent round so as to cover the bottom, back and top. The sides are not so important since they will not take the direct force of the

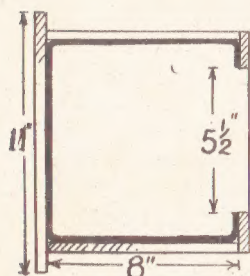


Fig. 1—End section

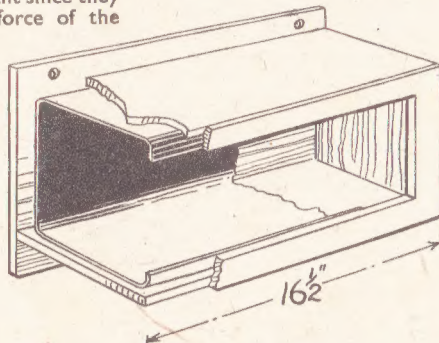


Fig. 2—Cut-away view

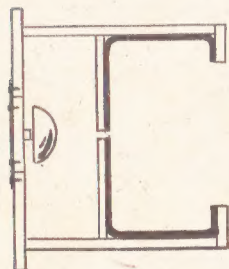


Fig. 5—Indicator bell

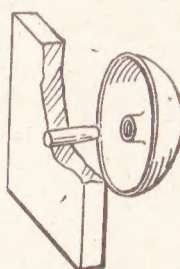


Fig. 6—Bell fitting

bullet, but they could also be covered with similar material if desired.

There is no need to fix the main sheet of 'armour', but the ends will need to be screwed in place. Your local ironmonger should be able to supply you with the metal and will probably have it bent to shape for a small extra charge.

To Hang and Use

To hang up the box you will need to bore two holes in the back. Alternatively you could obtain two suitable hangers and fix in place with screws. The hangers can be purchased locally for a few pence.

Paint Box—(Continued from page 357)

Four small metal corner pieces are tacked on to the lid to hold the cards in position for painting. It is best to cut away the wood so that these are flush to enable the case to close nicely.

Now in conclusion a word or two about materials would probably be welcomed by the budding artist. It will be found cheapest in the end to always buy the best of everything. Get artists colours and not students, which are coarser in texture and often fade rather badly. The actual colours chosen will

To use, you simply pin two targets over the opening and firing side by side, make your allotted number of shots and compare scores.

Bear in mind that the measurements need not be strictly adhered to, since the size of wood obtainable may vary. Decide what material you will use and then decide on the measurements required.

An Electric Indicator Bell

Since it is often difficult to see when the 'bull' is hit, it will add considerably to the enjoyment of the shooting if you have something to tell you definitely

when a 'bull' is scored.

We have shown a modification of the original box so that an electrical indicator can be incorporated. The general measurements of the box will remain the same. You will notice in Fig. 3 that the metal sheet does not go so far back, but that a space is left for the connecting gadget to be fixed behind. First you must bore holes in the metal exactly behind the 'bulls' in the targets. Make the holes slightly larger than the black bull of the target.

The Connections

As you are using two separate targets you will need a separate connecting and wiring scheme for each. For each target a spring switch is made, as shown in Fig. 4. A box of $\frac{1}{2}$ in. wood is made up as shown. The measurements are not critical, but it should fit into the back, as indicated in Fig. 3.

Two holes of the same dimensions as the small boxes must be cut in the back before assembling the main box. The connecting boxes are held in place by a strip of metal or wood screwed to the boxes and the back, see Fig. 3.

The wires run from the two round-

head screws, as shown in Figs. 3 and 4. You will see that contact is made by the bullet striking the metal spring strip which momentarily touches the round-head screw. The wires can be led out through the top and bottom to the battery and bulb holder. It is advisable to use rubber covered wire, as this would be less likely to 'short'. Ordinary pocket-lamp batteries will suffice and will last a considerable time with 3.5 volt bulbs, since the current will only be used intermittently.

A Bell Indicator

A more simple method of indication is by means of a bell. The general con-

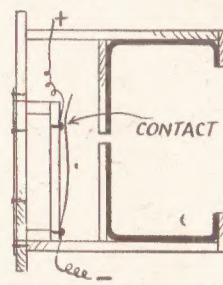


Fig. 3—Electrical connections

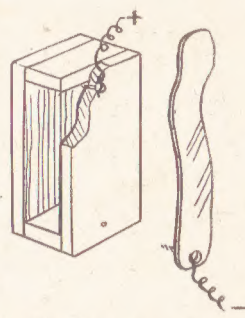


Fig. 4—Spring contact

struction is shown in Figs. 5 and 6. The holes in the metal allow the bullet to strike the bell when a bull is scored. The bells are tops of old bicycle bells which are pushed on to a dowel let into a piece of wood, as shown.

The cut-away view in Fig. 6 indicates how this is done. The square of wood is cut from the back itself and fixed back in position by means of a strip of metal, as shown.

The completed box should be given two coats of outside paint to withstand the weather.

The Backboard

In the event of no suitable wall being available you might construct a large backboard of rough boards held together by battens. The size of the board depends largely upon the accuracy of your aim, but one about 2ft. by 3ft. should be large enough. It should be fixed to posts at a convenient height and the bullet catcher hung, as on a wall.

Just one word of warning when enjoying yourself with a gun, always keep the muzzle pointed upwards or downwards whether loaded or unloaded. Never get into the bad habit of swinging it round in wild circles. (363)

white, neutral tint.

Brushes should be of sable and three will be sufficient in sizes 3, 5 and 8. The best pencils for light sketching in are grade B.

Whatmans water-colour paper or board 'not' surface is, undoubtedly, the best to use, but there are now quite an assortment of other makes on the market which are nearly as good.

To complete the kit put in a small piece of sponge, india rubber, some blotting paper and some pieces of clean rag. (372)

depend on the type of work to be done but the following list will form a useful foundation.

Yellow ochre, gamboge, cobalt, ultramarine, viridian, burnt sienna, light red, crimson, Payne's grey and Vandyke brown. With the following useful additions practically anything could be tackled—Aureolin, cadmium yellow, Naples yellow, chrome orange, scarlet lake, brown madder, brown ochre, Prussian blue, emerald green, olive green, terre verte, mauve, Chinese

Ornamental work can easily be undertaken to make A SUNKEN GARDEN

CEMENT work is often considered too bare and harsh for garden work, but it is not realized by many how decorative and suitable it can be for certain purposes. In the front of the house, where the area is too small for a lawn, a sunken garden made of cement is ideal.

It is advisable to make a sketch to fit the space available. Wooden boards are used for the moulds to hold the cement until it has set, so straight lines predominating in the design will make for easier building. Small portions of curved wall can be incorporated, and these are useful as a foil to the straightness of the main lines and can be used to break up any great length of straight wall. A plan of a pleasing formation such as seen in the photograph is shown in Fig. 1.

Preparation

In preparing the site, determine how much below ground the base is to be. The soil is marked out slightly larger than the actual measurements of the plan, to allow for the wooden moulds — of the walls which hold back the earth. The soil is dug out to the depth of the garden, plus the thickness of the base, plus an allowance for broken rubble or ashes on which the base is laid.

Do not disturb the soil to an unnecessary depth as a hard firm base is required, and soil newly dug is apt to sink after a time. The foundation of rubble should be well rolled in.

Wooden boards are sunk in at the outside limits of the base, and levelled up at a height which allows an average thickness to the base of 1½ ins. of cement. It should nowhere be less than 1 in. in



A photograph of a sunken garden made of cement

thickness. If a flower bed is to be left in the middle of the base, boards limiting the size of the bed must also be fixed, then the area in between is ready to receive the cement.

Base Work

The boards may be of any wood which will make a straight edge to hold in the cement; old fence palings serve the purpose well. This base is the largest surface of the sunken garden; it must be marked out. When the cement has set but before it has hardened, indentations can be made.

If the end of a stick is drawn across in different directions, with more or less pressure according to how firm the cement has set, a series of lines is obtained which breaks up the bare area and gives the impressions of stones laid side by side. The width of the breaks is controlled by the different widths of sticks.

Cut the lines as the work proceeds as soon as the cement is firm enough.

Do not leave the lines until the end, unless it is a small area, as by that time the first section may be too hard for marking, and with a square area or one more than about four feet wide it may be impossible to reach the centre to cut the lines, while the cement is still soft.

Fig. 2 represents (on left) a section of the wall with wood mould removed and wall marked out. To the right the wood strips erected ready to receive cement. If very long, small strips of wood can be tacked across top to give support. Dotted lines represent where the curved section will be placed and this will be done last. The two completed and hardened straight sections will give firm supports for erecting strips of linoleum.

Note on the completed section on the left, the crossed lines which are made in the cement before hardening. They can be made with a knife and are to give a better grip when the next section is joined on, and on top the 'tiles' will stick better.

The walls are made in sections, each section being marked out as soon as firm enough. On the straight sections being completed, the curved parts are filled in. When building the moulds for the walls, fix the boards lightly.

Bricks on the outside are sufficient to prevent the boards bulging out, and strips of wood

across the top and pieces lightly tacked at the end will be sufficient to prevent the boards falling in. The boards can then be dismantled easily without damage to the cement.

(Continued foot of page 362)

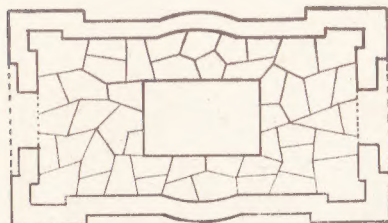


Fig. 1—A simple plan with slight curves

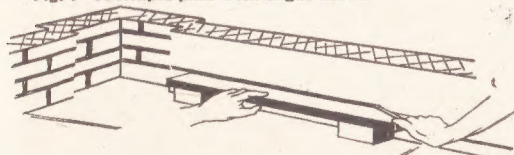


Fig. 3—Wood strip to mark lines

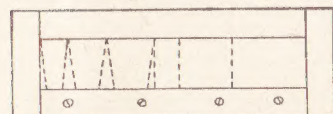


Fig. 5—Six shapes in mould with dotted lines representing cut

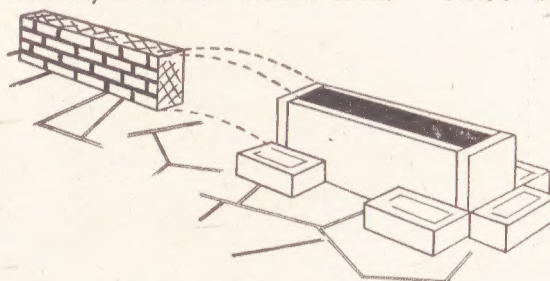


Fig. 2—Constructional details of the wall



Fig. 4—The frame for moulding, with front edge screwed on

and the depth is made by pressure or repetition over the same line.

A straight edge of wood may be used as a ruler, but pressure on this must be avoided. Lines too deep are not advisable as they will weaken the area as a whole.

How the home handyman can make a simple HANDY KITCHEN UNIT

OCCASIONALLY it happens that there is need for a re-arrangement of shelving in the kitchen. Perhaps you have had a change of furniture which leaves an awkward shelf in the wrong position.

Perhaps—and here is the best reason for the construction of one of these units—there is an annoying little shelf which seems to collect all the odd bottles, tins and packets so necessary to

shelves which will neatly contain a good selection of odds and ends, and an upper cabinet with a sliding door which is useful to keep the family boot-blackening materials in.

It may be used for shaving gear by those who are obliged to shave in the kitchen! There is nothing to prevent the fitting of sliding doors to all the shelves, with the necessary modification of the runners for the two mid-shelves.

The unit has no back, and is planted on the wall in a suitable position, fixed with a ledging strip underneath the lower shelf and two iron angle brackets inside the top, screwed into wall plugs.

Actual overall measurements will depend upon the size of the boxes obtained. The wood of the average packing case is of varied quality, and it is advisable to finish the unit in a good hard gloss paint after suitable priming. The sliding door should be made a good free fit to allow for the paint. See that the paint has hardened before use, or the door may stick in the grooves.

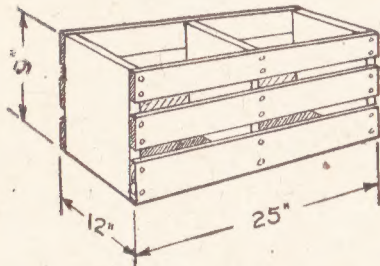
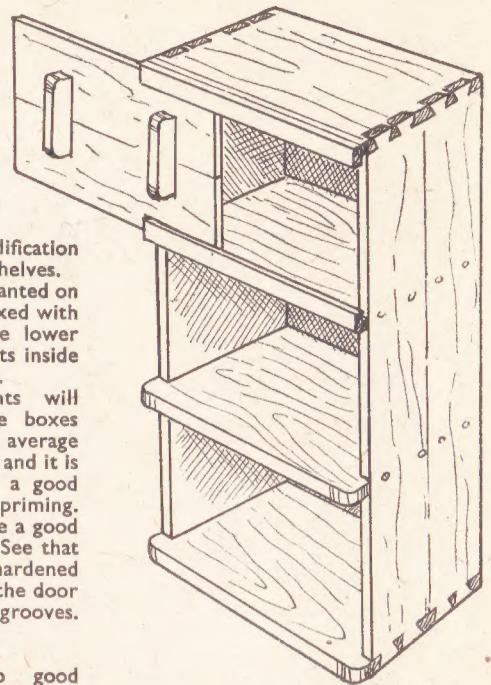


Fig. 1—Typical fruit box—two required

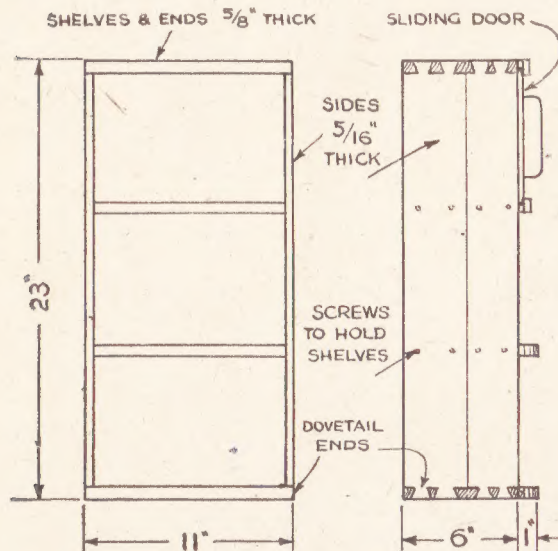


Fig. 2—Front and side view: sliding door not shown

Material

Obtain two good boxes of the approximate size shown in Fig. 1. Try and get those with solid ends of about $\frac{5}{8}$ in. material, and avoid those with battened and nailed ends, as they make for unsightly shelves.

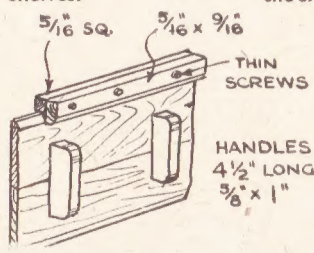


Fig. 3—The door with batten handle

a kitchen, but which for long have left an impression of straggling untidiness.

The unit provides two very useful

One box may provide sufficient material if it is free of unsound knots and no splits occur when extracting the

nails. Select the best pieces of wood from the lot.

Construction

Cut the top to 11ins. by 6ins., and the bottom to 11ins. by 7ins. The two mid shelves are shorter by the thickness of the sides.

The sides are matched up from the thinner pieces of wood. Two pieces about 3ins. wide should be planed down to make a side 6ins. wide. The top and bottom ends should, preferably, be dovetailed to the sides but they may be screwed or nailed if a quick job is required. Fix in the mid shelves equally spaced between the ends.

The two lower shelves project 1in. to the front and have rounded corners.

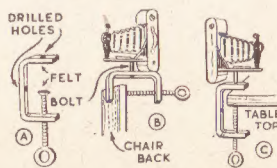
Sliding Door

A piece of plywood $\frac{1}{4}$ in. thick will make a better door, but two pieces fixed by the handles, as shown in the drawing, will serve well. Cut the door $\frac{1}{4}$ in. wider than the space between the shelf and the top, so that it will not fall inside, and screw on the runners, leaving plenty of slack for the door to slide easily. Needless to say all these parts must be planed and glasspapered quite smooth.

An Inexpensive Camera Stand

An inexpensive but extremely useful camera stand can be made from a Hobbies cramp and a 2ins. by $\frac{1}{2}$ in. gutter bolt and nut.

Cut off the head of the bolt, and drill and tap the top and side of the cramp, as at Fig. A., to take the bolt. Pieces of felt placed at the points shown in Fig. A. will ensure that damage to furniture is avoided when the stand is used in such ways as those shown in Figs. B. & C.



Readers may well make for themselves this complete ARTIST'S PAINT BOX

THERE can hardly be a more pleasant hobby for the fine sunny days than to get out into the open air with paper and colours and to paint some of the scenery around us. Why not make the most of this Festival of Britain Year and capture the ever-changing beauty of our countryside?

Wherever we live, be it busy city street or the heart of the country, there is always something to interest the true artist. The person who can paint reasonably well need never be idle, nor should he find it difficult to dispose of the results of his labour.

Water-colour drawings suitably mounted and, perhaps, framed, form admirable gifts, and it is even possible that there will be quite a ready sale for most of the work. People are always willing to purchase good paintings, and at the present time they are considered a very good investment.

A Holdall

The handy painting box described in this article was designed to meet the needs of such an artist. It contains all the materials necessary for a day's sketching outing and is complete in itself. The box is easily made, it is light in weight and very compact.

There is ample space for a good assortment of colours, a place for pencils and brushes, rubber, mixing palette, water container and other sundries. In the lid, which also acts as an easel, there is plenty of room for half-a-dozen prepared water-colour boards.

Mahogany is the wood generally used for making commercial painting boxes,

and if you can use this it will make a really first class job. Walnut is a second choice, but there are many other hardwoods that are suitable, and this includes plywood which will make a quite serviceable box.

Size

A very useful size to make the paintings is quarter imperial or 15ins. by 11ins., and the box has been designed to hold this size. The box could be made smaller if desired, but sketches which are much smaller are liable to cramp the style and are not to be recommended.

The outside measurements of the box are 16ins. long, 12ins. wide and 2½ins. deep when closed, the lid being 1in. deep and the bottom part 1½ins. deep. For the top and bottom thin plywood is used, and this is cut to the exact outside measurements, the case and lid then being built up on them.

The sides are made up of wood having a thickness of ¾in., and where extra strength is needed, such as the hinge sides and also the handle bar, the thickness is increased to 1in.

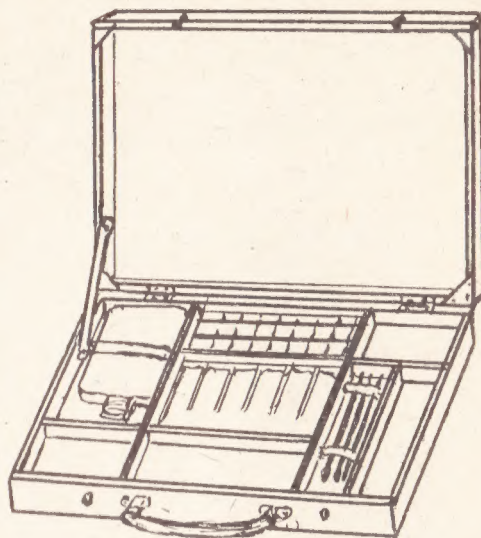
For the case cut two strips 16ins. long, 1½ins. wide and ¾in. thick, and two strips 11ins. long, 1½ins. wide and ¾in. thick. Glue firmly and tack on to the ply base with fine panel pins, also carefully secure the corners with panel pins. Small corner blocks can be added if thought necessary.

The Lid

The construction of the lid differs slightly from the case; only three sides being glued to the ply panel. The fourth side which, when the case is open for use, is at the top, and is hinged to the ply for inserting the water-colour boards.

Cut two strips 16ins. long and ¾in. wide, one being ¾in. thick and the other ½in. The two short sides are 11½ins. long, ¾in. wide and ½in. thick. Glue and pin the three sides firmly to the ply, while the hinged strip can be fixed with a strip of tape glued on the entire length.

The case can now be glasspapered smooth, a pair of strong brass hinges fitted and a strong but light handle screwed or bolted on to the base of the case.

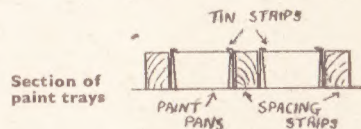


Raised Lid

In order to keep the easel lid in a convenient position for painting, a strut is fitted to the left-hand corner near the water container. It is very simple and is just a strip of brass about ¾in. wide with a hole in each end. One end is screwed to the side of the case and the other end is adjustable and slips over one of several small round-head screws fixed in the side of the lid. By moving from one to the other the correct angle can be obtained for easy painting.

Two small catches and screw eyes fitted on either side of the handle keep the case securely closed for carrying.

The inside fittings can now be put in position and thin strips of about ¼in. thickness are quite sufficient for the job.

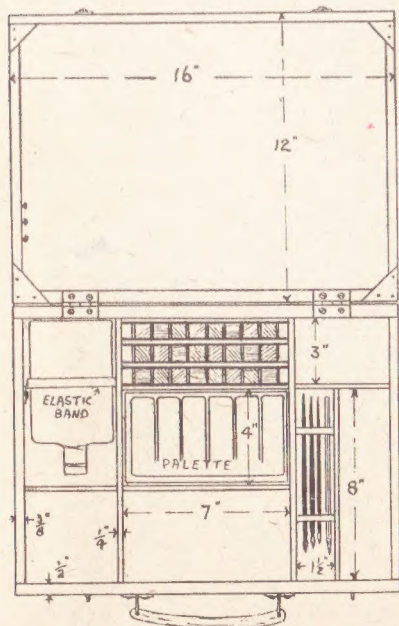


The exact positions and placing of the partitions must be left to the artist, as individual requirements may vary considerably. It may happen that you already have a good colour box and wish to fit this in the box, or you may decide to have more or less than the twenty-four colours as shown.

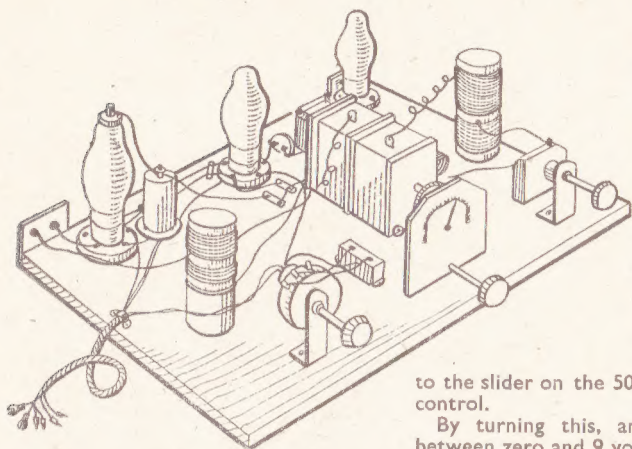
The colours are obtained in half-pans which usually measure ¾in. by ¾in., and they are here arranged in three rows of eight. The rows are kept in position by strips of tin bent over slightly, as shown in the sketch.

Brushes and pencils are held in their positions by two strips of elastic and the water container could also be secured in a like manner.

(Continued foot of page 354)



The amateur radio enthusiast should make this SCREEN GRID THREE



THE constructor who has built some of the 3-valve circuits employing only one tuned circuit will probably like to go a step further and make a receiver with a high frequency stage. With the latter, two tuned circuits are used, thus considerably increasing selectivity (sharpness of tuning). Both coils are tuned simultaneously to the same wavelength by a 2-gang condenser (which resembles two ordinary single tuning condensers on a common spindle).

Circuit Explanations

In order that the operation of the

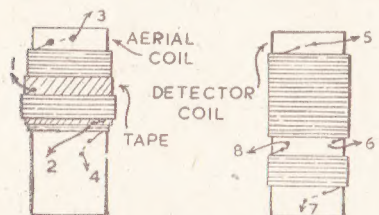


Fig. 2—The tuning coils

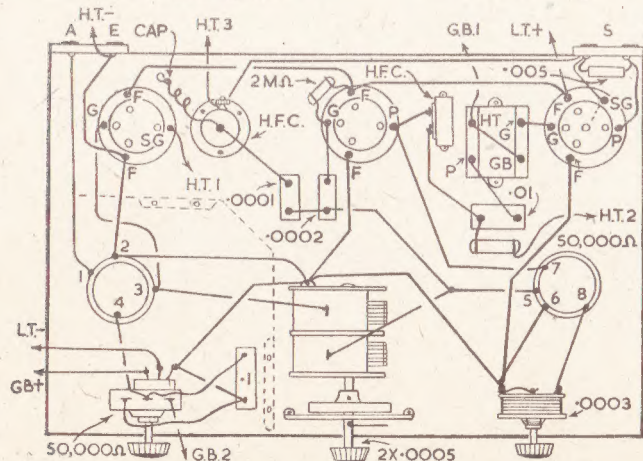


Fig. 3—Complete wiring diagram

circuit can be understood, the builder should examine Fig. 1. The first coil is tuned by one section of the gang condenser, the aerial being coupled by the small winding between points 1 and 2. To control volume, the bottom end of the tuning coil (3 and 4) is taken

to the slider on the 50,000 ohm volume control.

By turning this, any value of bias between zero and 9 volts can be applied to the valve, through the coil. This adjusts the degree of amplification provided by the valve, and consequently the volume. The bottom end of the coil

This assures sufficiently sharp tuning for all ordinary purposes, with ample speaker volume on a good selection of stations.

Winding the Coils

It is essential that the tuned section of each be exactly the same, so the tubes must be of the same diameter. Also employ the same gauge wire for each coil, and put on the same number of turns. The coils are shown in Fig. 2, and the tuned section of each is between points 3 and 4, with the aerial coil, and points 5 and 6, with the detector coil. With a 1in. diameter tube and 32 S.W.G. enamelled wire, 90 turns, closely side by side, are used. With a 1½in. tube, use only 80 turns on each coil.

Bind two or three layers of thick insulating tape round the bottom of the aerial coil winding. On this put 35 turns, side by side, as shown.

With the detector coil, leave a ½in. space, then put on 50 turns, side by side,

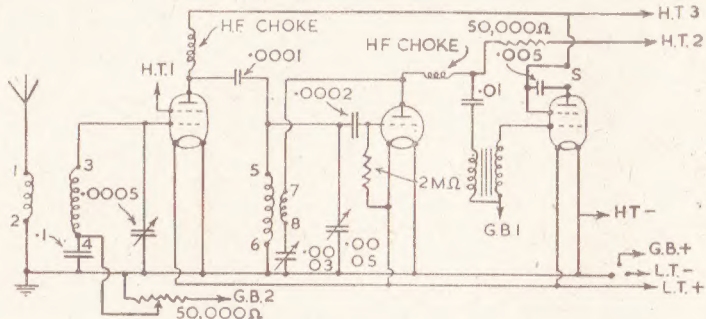


Fig. 1—Theoretical circuit of the receiver

is by-passed to the earth line by a .1 mfd. condenser to allow it to tune correctly.

The amplified signal cannot pass the H.F. Choke, instead going to the detector coil (5 to 6). The latter is tuned to the same wavelength as the first coil, and

has reaction applied through the small winding between points 7 and 8. After detection, the signals, now converted to audio-frequency, are further amplified by a transformer fed through the .01 mfd. condenser, and the pentode or tetrode output valve.

below the other winding, as illustrated.

All turns throughout must be in the same direction, and the ends can be made secure by passing them through pairs of small holes drilled in the formers. In the case of the winding between points 1 and 2 this is not possible, and the ends may be secured by binding with cotton, or with additional pieces of tape. Leave all the ends a few inches long to reach the various parts. The coils can be mounted by pushing them on discs of wood screwed to the baseboard.

Base and Parts

The simplest form of construction is to use a baseboard ½in. thick and about 7ins. by 12ins. Screw down the parts in the positions shown in Fig. 3. The two outer controls are mounted on brackets. The tuning condenser, with reduction drive, is screwed down centrally. The knobs should project over the front edge of the baseboard, so that the receiver can be placed in a cabinet from the back. The control spindles will then project through clearance holes, and the tuning dial come opposite a suitable cut-out.

Two 4-pin holders are used, and one

5-pin, for the output valve, which is near the speaker sockets. The high frequency valve will have a top cap, and this is connected through a short flexible lead to the first H.F. choke. The latter should be a good one, preferably of the type employed for high frequency coupling.

The second choke is only for reaction purposes, and is not critical. The coupling transformer may be of ordinary type, or that especially intended for coupling in this way, if the latter is to hand.

The volume control is a 50,000 ohm one, with internal 3-point switch. This enables both low tension and grid bias batteries to be switched off, and the latter is necessary, here, or the battery would run down through the volume control element even when the set was not in use.

Wiring Details

Any insulated wire of about 22 S.W.G. or so can be used, and flex is employed for the battery leads. If the wiring diagram is followed, no difficulty should arise. Keep all leads short and direct, especially those going to the tuning coils.

The coils themselves should be kept well apart on the baseboard, otherwise coupling between them will cause uncontrollable oscillation. The gang condenser will normally provide some measure of screening between the coils. If it is very small, and oscillation arises, it will be necessary to erect a metal screen in the position shown by the dotted line. This may consist of zinc, aluminium or similar metal, and can be mounted by bending a flange and screwing to the baseboard. It must be connected to the earth socket by a short

lead. Where required, notches can be cut for leads to pass under it.

Valves to Use

Any screen grid, detector and output valves in good condition are satisfactory. In the left-hand holder, S.G. types such as the VS24 can be used, or high frequency pentodes such as the 210VPT (4-pin). For detector (centre holder) a HL2 or similar type is used. For output, a tetrode or pentode such as the 220HPT. (In the latter case, a triode can be used, with no alteration of wiring, but will provide slightly less amplification).

Up to 9 volts can be applied to GB2. GB1 will require about 4.5 to 6 volts, according to type of valve. HT1 will require about 48 to 72 volts, according to valve. HT2 will require about 60 to 108 volts, with 120 volts, for preference, for HT3. (These voltages can be adjusted to note the difference in reception resulting).

For maximum results, both tuned circuits must gang correctly together. To assure this, tune to some weak station with the plates of the tuning condenser almost fully opened, and with the usual aerial and earth connected. Now adjust the small trimming screws on the gang condenser sections, carefully re-tuning, if necessary at the same time, until maximum volume has been obtained. Both circuits should then tune simultaneously together.

Experimenting

If a .0003 mfd. pre-set condenser is used instead of the .0001 condenser, it can be adjusted to provide various degrees of coupling, and volume or selectivity can be further increased, if desired, according to how it is set.

Transformer coupling is also possible between H.F. valve and detector. To do this, put an additional winding on the detector coil, just as shown on the aerial coil in Fig. 2. Take the H.F. valve cap to point 1 on this new winding, and point 2 to H.T. positive. The H.F. choke and associated .0001 mfd. condenser are now not required. When properly arranged, this form of coupling can be very satisfactory.

The H.F. valves mentioned were of the type known as variable-mu ('mu' means 'amplification'). This means they can receive any value of grid bias without distortion. Old valves, such as the 2155G types, though otherwise excellent, cannot be used in this way. Therefore, if such a valve is to hand, it will be necessary to omit the volume control and .1 mfd. condenser, instead taking point 4 on the coil directly to the earth line of the set. An ordinary small switch can then be used for on/off switching of the low tension battery, there now being no need to switch the GB positive lead as well.

If it is desired to simplify matters and use ordinary transformer coupling between detector and output valve, omit the .01 condenser and 50,000 ohm resistor. Take 'P' on transformer to the H.F. choke, and H.T. to about 60 volts on the H.T. battery. Take G.B. terminal to the grid bias battery, about 4.5 volts. The grid lead to terminal 'G' remains unchanged.

With a very long aerial it is desirable to connect a small condenser in lead going to point 1, or the aerial coil may not be able to tune correctly with the detector coil, with consequent loss in volume. Normally, however, good results should be obtained at once.

Readers' Problems—

Transformer Alteration

I HAVE a small transformer which operates on 230-250 volts—50 cycles A.C. driving an electric train set. I should like to alter it so that I could use it on my mains supply which is 230-250 volts 30 cycles A.C. (S.S.—Chesterfield).

FOR a supply averaging 240 volts, 50 cycles, 1,920 turns per sq. in. of core cross-sectional area will be employed. For use on 30 cycles, the number of turns will require to be increased to 2,340 per sq. in. To avoid complete re-winding it might be possible to add approximately 400 turns to the primary, assuring these extra turns are in the same direction as the existing primary, and well insulated from the secondary and core stampings. It is also desirable to add turns to the secondary at the rate of 2 for each volt of the model driven (e.g. 12 volt train, add 24 turns). In the event of the cross-sectional area of the transformer core not being 1 sq. in., determine its actual area by measurement and multiplication, and multiply 2,340 by the figure obtained to find the number of turns required on the particular core size in question. A

core suitable for 240 v. at 50 cycles will have a reactance suitable for 190 v. at 30 cycles. If re-winding is to be avoided, a power resistor or lamp to drop 50 volts could be included in series with the primary, extra secondary turns being added to the transformer to increase the output if the model is sluggish.

Solving Interference

I HAVE constructed a crystal set and find there is too much interference all the time. Is there any way to cure this? (L.F.—Oakenshaw).

YOUR trouble is caused by lack of selectivity, and this is a fault inherent in all crystal set circuits. However, as a rule it should be possible to receive at least one station free from interference. If your aerial is very long, it may be reduced, or a condenser of about .0001 to .0002 mfd. connected in series with the lead-in to the receiver. (If available, a pre-set or variable condenser is best here, as the capacity can then be adjusted to the most suitable value). If the receiver uses a slide-coil tuning arrangement, in some

circumstances tuning may be sharpened by connecting a variable or fixed condenser (maximum capacity .0005 mfd.) in parallel with the winding (e.g. from aerial to earth). Unfortunately most arrangements serving to sharpen tuning, reduce volume.

Commutator Construction

I AM making a three-pole motor of the pronged type, and do not quite know how to connect up. Should I have three brushes? I have only two, with three-section commutator. (E.B.—Shooters Hill).

YOU should use a commutator with three segments, and two brushes only are required. Wind each pole of the armature in the same direction, looking at it from the outside end. The beginning of each winding should now be connected to the end of the winding next to it. When this is done all round, there will be three double ends, and one of these is connected, in orderly sequence, to each commutator segment. The commutator should be turned a little one way or the other in relation to the armature poles as necessary, to obtain the best running position.

Keep fit by making and using A HOME PUNCH BALL

PUNCHING a heavy bag for a few minutes every day is a simple and cheap way of keeping fit. But for real enjoyment in this way there is nothing to beat the springy punch ball. The effects of the punching can be better judged, and if you should get off balance when close to the ball you will find that it can 'retaliate'—sometimes rather painfully!

Contrary to what is generally believed, the punch ball is not a piece of equipment intended solely for the would-be boxer. Whatever may be the owner's favourite sport, he will find that the ball teaches quickness, balance, and co-ordination of hand and eye, three factors that are of prime importance in any athletic game.

The Ball

It is possible to buy the actual ball which is inflated in much the same way as a football. This will give the most satisfactory results if it can be fastened to the top of a sprung standard, but the fellow who wants to do the entire job from scratch can easily do so.

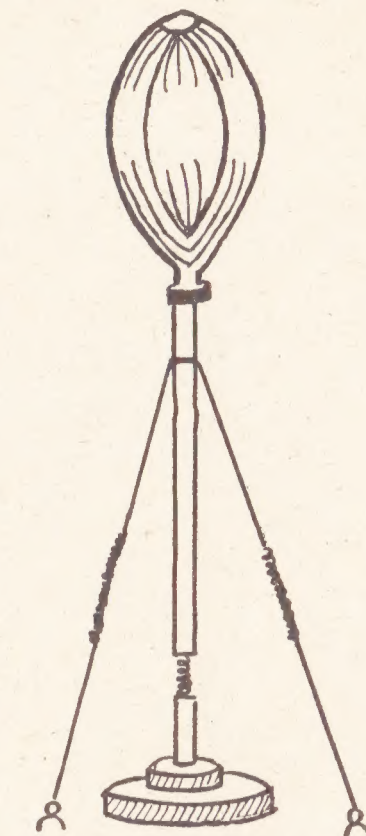
A piece of 1in. thick wood is taken, and a circle of 1in. radius is cut from it. A hole 1in. in diameter is cut from the centre of this, and eight thin holes are made with a gimlet in the $\frac{1}{2}$ in. rim remaining, these holes being spaced at equal distances apart.

The column is a length of 1in. diameter ash or similar dowelling, 4ft. in length. It fits up through the hole in the previously prepared disc, which is glued to it, so that its top face is at 11ins. from the extreme top of the column.

Wire Supports

Four fairly long lengths of springy galvanized wire are needed. One end of each piece fits in one of the holes in the collar and goes up to the top of the column, across it, and down to the hole directly opposite to the one from which it started. The object of these wires is to form a pear-shaped outline about 8ins. across at the widest part. Drawing (A) gives a sectional side view of the top of the column, showing one such wire in position.

The wire outline will not be found to hold its shape very well, but this is soon



remedied. The end of each wire should be bent sharply at right-angles, so that it is firmly anchored underneath the collar, and the wires should be hammered down firmly (and, if necessary, stapled) at the head of the column. Strands of thin wire can then be tied horizontally to connect the main wires and hold them in place.

The main wires divide the shape of the ball into eight panels. Using a brown paper pattern as a guide, eight panels shaped as at (B) are cut from some good

quality canvas, being made rather wider than required to allow for hemming. These panels can then be stitched to the main wire framework with stout thread, but at this stage the panels should be sewn only half-way up the height of the ball.

Stuffing

Kapok, hair or similar material can be used as stuffing. This should not be packed too tightly, but should be worked into place so that the ball keeps its proper pear shape. As the filling is worked up the ball, the seams of the canvas covering are sewn to the frame. When sewn, the ball will resemble drawing (C).

To prevent the wire frame working through its covering, some thin cotton wadding should be wrapped round the ball and may be held in place, temporarily, by a few stitches. A large piece of leatherette or similar material is tacked through its centre to the top of the column, and is then smoothed down over the ball, pleated as necessary, and tacked to the top of the disc.

The Base

Work can then be started on the base.

Two 1in. thick discs are needed for this, one having a diameter of 9ins. and the other of 4ins. The larger disc should be made up in two halves, and in each portion a series of 1in. diameter holes can be bored to a depth of $\frac{3}{4}$ in. Five such holes will be sufficient on each half-portion (see drawing (D)).

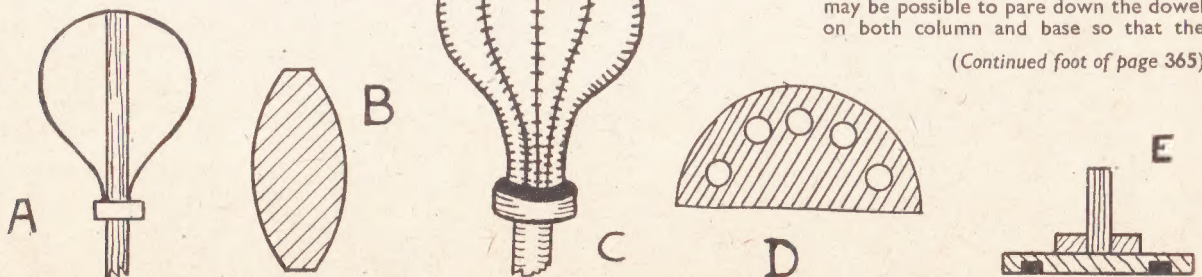
The smaller disc has a 1in. diameter hole bored in its centre, into which a 4ins. length of 1in. dowelling is glued. The two halves of the lower disc are glued and cramped together, while the smaller disc is glued and screwed to the centre of it (see sectional view at (E)).

Weighted Base

To give extra stability to the base, some scrap lead can be melted down and poured into the holes on the underside of the larger disc. The molten lead will char the wood and the weights will tend to fall out, but when each piece of lead has set, a hole can be knocked through it with a large nail, and it can then be held in place by a screw.

The column is fastened to the base by a short length of stout bed spring. It may be possible to pare down the dowel on both column and base so that the

(Continued foot of page 365)



Now is the time to consider the erection of A GARDEN TOOL SHED

A TOOL shed is a desirable feature in any garden, but, unfortunately, its construction calls for a considerable amount of timber. Every handyman knows how difficult it is, nowadays, to get hold of wood in any quantity.

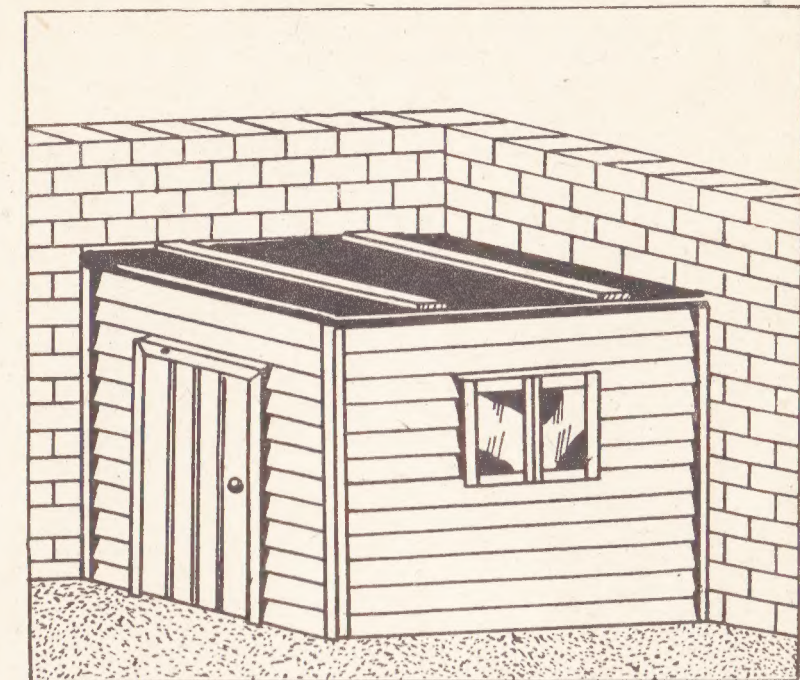
If the garden walls are of reasonable height, however, it is possible to build a shed in one of the corners. Such a building can be quite large, but is economical, as it requires less than half of the timber needed for a shed of comparable size built in the open.

In the details given below definite sizes have been suggested, but these can be varied as necessary to suit individual requirements.

Framework

Two frames will be needed, both being made up of 2ins. square material. The long side frame measures 7ft. long by 6ft. 6ins. high, outside measurements. All corners are secured by bridge joints which, as can be seen from drawing (A), closely resembles the mortise and tenon joint. Before assembly, each joint should be brushed with red lead, and to make it more secure, a hole is drilled through it and it is pinned with a length of hardwood dowelling.

Two intermediate uprights are also fitted, these having their inside edges at 2ft. 6ins. apart and being central as regards the length of the frame. To enclose the window opening two 2ft. 8ins. long crossbars are housed into



these uprights, these last having their bottom edges at 4ft. 1in. and 5ft. 7ins. from the bottom of the frame. Drawing (B) shows the type of joint used for

fitting these bars, while (C) shows the main dimensions of the long frame.

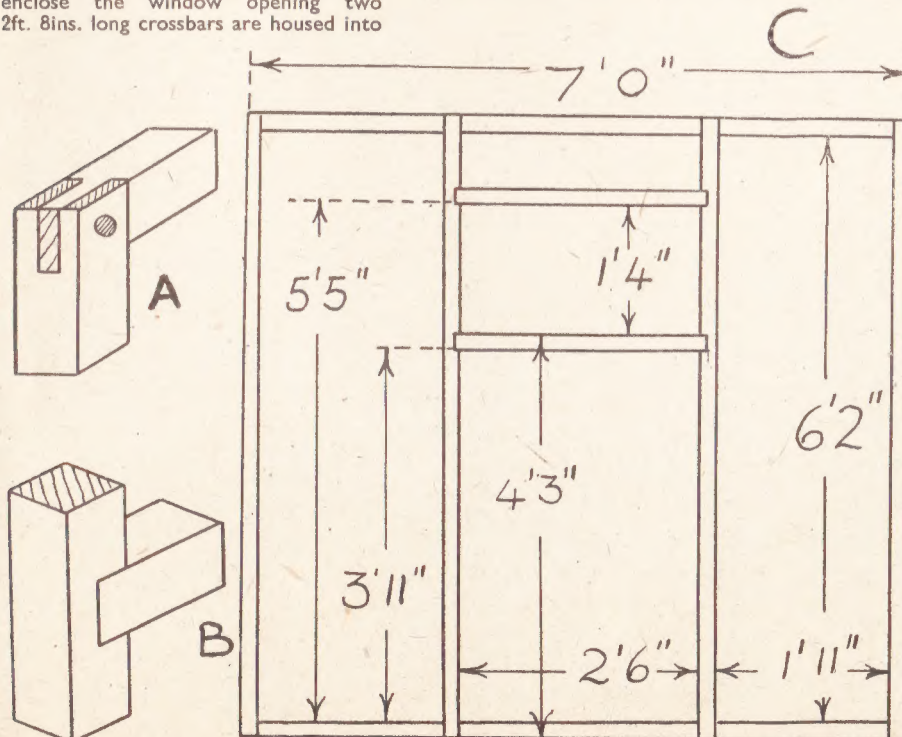
The end frame is made in much the same way, but has outside measurements of 4ft. 6ins. by 6ft. 6ins. This frame carries the door opening, the size and position of which is clearly shown at (D), and it also has two short horizontal rails that hold the door uprights at their correct distances from the outside uprights.

When completed, both frames should be taken to the site for erection.

Erection

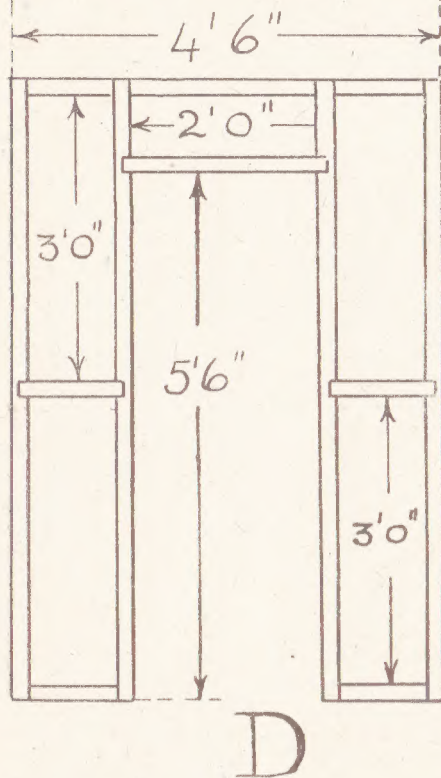
If the shed is being erected on a concrete foundation, the frames can be stood directly on this, but if it is an earth site, the soil must be levelled, all weeds, grass, etc., removed, and the frames stood on a few odd bricks. This will allow of free ventilation underneath the shed and thus prevent rot setting in in the floorboards.

For subsequent dismantling if it is ever necessary, the meeting edges of the two frames can be bolted together, sinking the bolt-heads well into the wood to avoid interference with the weatherboarding. The end of each frame that butts against a wall will need to be screwed to



wooden plugs set in the wall. The holes for these plugs are cut with a hammer and brick chisel, the plugs are put in place, and a little cement is run in round them. When the cement has dried the projecting parts of the plugs

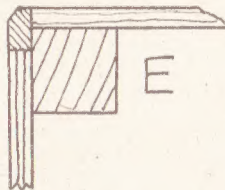
which may be chamfered on one edge to make a simple moulding. This moulding is nailed into place with its inside edge flush with the inside edges of the window opening, the bottom edge of the rail of the door frame, and the inside edges of the two uprights of the latter, but extending only to the height of the door frame rail. It will be seen that where this moulding is applied it makes a rebate on the framework.



Moulding

Similar lengths of moulding are then nailed to the three uprights. On the two uprights that butt against the wall, the moulding similarly rests against the wall, but on the third upright the moulding is nailed so that it projects $\frac{1}{2}$ in. beyond the face. In this way it forms a double rebate on the upright which will cover end-grains of the lengths of weatherboarding. Drawing (E) gives a section through the upright, showing how this moulding is fitted.

The various pieces of weatherboarding can then be sawn to length and nailed into place, working from the bottom rail upwards.



can be sawn off and the wood rasped down to the level of the wall surface.

The window and door openings must then be framed with $\frac{1}{2}$ in. strip,

Two 2 ins. square rails should be fastened to the walls to act as roof supports. The top edges of these should be level with the top rails of the two

frames, and they will have to be screwed to wooden plugs let into the walls.

The roof itself should, preferably, be of grooved and tongued boarding, and is simply nailed on to the rails. It should be allowed to slightly overhang the sides of the shed, and should be covered with roofing felt. The joints in the felt should be covered with small wooden battens, as shown on the drawing of the finished shed.

The Door

Grooved and tongued boarding can also be used for the door, which measures 5ft. 6ins. by 2ft. Lengths of boarding are cramped together to make up the desired width, and are nailed on to three horizontal rails of 3ins. by 1in. The door is hung so that the rails are on the inside of the shed.

If desired, the window glass can be cut to size and fixed permanently into place, but it will be more satisfactory to make two rebated frameworks. Wood 1in. wide by $\frac{3}{4}$ in. thick (carrying a rebate $\frac{1}{2}$ in. wide and deep on one edge) will be found most suitable for this. As there are no intermediate bars, ordinary halved joints may be used on the corners. Each framework has outside measurements of 1ft. 3ins. long by 1ft. 4ins. high.

Sheds of this type are not normally fitted with a floor, though one may easily be fitted if desired.

Weatherproofing

To make the shed completely weather-proof it is advisable to seal the joints between the uprights and the wall with some thin mortar. Similarly, the small gap along the back of the roof caused by the rough surfaces of the brickwork can be closed by a thin strip of zinc bent at rightangles, one arm of the angle-piece resting on the felt and the other against the brickwork. (293)

Sunken Garden—(Continued from page 355)

This is done when the cement is firm enough to stand on its own. With a stick, or blunt end of a pencil and a straight piece of wood, the wall is then marked out in the form of stones in layers. The horizontal lines are first marked the entire length of the section, the vertical

lines are added after, according to the desired size of the 'stones'.

Curved walls are made in a similar manner except that a bendable material must be used for the side of the wall. Strips of old linoleum will do, but they must be well supported on the outside

as they tend to bulge under the weight of the cement. A perfect curve is not necessary as such imperfections are lost when the surface is cut into small stones.

If a piece of curved wood is not available for cutting the lines across, short straight pieces can be used, taking care not to dig the ends into the cement.

A nice finish to the top of the wall is obtained by making separate slabs of cement, wider than the wall itself, so that they jut out slightly. These slabs can be made by making a mould of a base plank, a fixed strip of wood running the length of one side of the plank, and a similar strip but detachable on the other side. The ends too will of course be built up to hold the cement.

If a smooth finish is required, the cement is used fairly wet. There should be no small stones in the sand. When firm, this long strip of cement can be cut across with a knife while in the mould; finally before absolutely hard the movable strip is taken away and the slabs separated.

For the top of the curved wall, pieces will be cut out narrower one end than the other. The slabs when hard are cemented on top of the walls, the gaps in between being filled in with very liquid cement. (293)

Our Advertisement pages are
always worth studying



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Experiments with cobalt chloride in our series of HOME CHEMISTRY

THE mention of cobalt chloride conjures up the idea of sympathetic inks. The interest of cobalt chloride for the home chemist, however, need not finish there, for many cobalt compounds can be made with simple apparatus and common chemicals. Those dealt with in this article are some of the rarer ones and, therefore, doubly interesting.

A Beautiful Compound

Cobalt mercuric thiocyanate is an unusual and beautifully coloured compound. To prepare it mix solutions of cobalt chloride and mercuric chloride, then add ammonium thiocyanate solution. Unless the solutions are strong nothing happens immediately, but on standing a splendid royal blue crystalline precipitate forms. Set the solution aside overnight so that the precipitation may complete itself. Then wash it by decantation several times, preferably with hot water.

Pigments

Cobalt salts when heated with salts of some metals form brightly coloured substances of complex composition. These are known as cobaltites and are used as pigments. Rinman's green, for instance, you can prepare by mixing solutions of zinc sulphate and cobalt chloride and then adding sodium carbonate solution.

Filter the precipitate, wash it on the filter, and dry it in the oven. If you now heat this strongly in a crucible carbon dioxide and water will be given off and the pigment will be left in the crucible.

Cobalt blue or Thénard's blue is another of these cobaltites. To prepare it, mix cobalt chloride and alum solutions and precipitate with sodium carbonate. Then filter, wash, dry and heat it in a crucible. Both of these pigments make good oil or water colours.

Cobalt Yellow

Another brightly coloured cobalt compound is potassium cobaltinitrite, which is also known as cobalt yellow. To prepare it, add acetic acid to cobalt chloride solution until the mixture smells strongly of the acid. Now add potassium nitrite solution.

Either at once or on standing, a brilliant yellow crystalline precipitate of potassium cobaltinitrite is formed. Filter, wash and dry it in the usual way. This reaction serves as a useful test for cobalt or potassium, but as ammonium forms a similar compound, it should be used only as a confirmatory test.

If you have the use of a rough balance, such as a cheap photographer's dispensing balance, you can make up a solution of sodium cobaltinitrite, which is soluble in water and can hence be used as a test solution for potassium or

ammonium. Dissolve 5 grams of sodium nitrite and 3 grams of cobalt nitrate in 15 ccs. of warm water.

When they have dissolved, add 1 cc. of glacial acetic acid. On adding a few ccs. of this solution to a potassium or ammonium salt solution, yellow precipitates of the cobaltinitrites are formed.

Salts

When solutions of cobalt salts are mixed with ammonium salts and ammonium hydroxide and exposed to the air, they absorb oxygen, forming complex compounds known as cobaltamines. Over two thousand of these are known. One which is simple to prepare is roseocobaltic chloride. First pre-



Drying a precipitate

cipitate cobalt hydroxide by mixing hot solutions of cobalt chloride and sodium hydroxide.

Wash the pink precipitate well on the filter and dissolve it in a solution of ammonium chloride to which enough

ammonium hydroxide has been added to give it a strong smell. In a day or two the solution will have become violet-red in colour. Now add hydrochloric acid and some methylated spirit. A heavy red crystalline precipitate of roseocobaltic chloride is formed.

Drying

Filter and wash it with a little hydrochloric acid and then with a little cold water. Open out the filter paper and put it on a clean porous tile or brick, as shown and leave it to dry at room temperature—not in the oven, for heat decomposes it.

A beautiful pink salt of cobalt is the oxalate. This is insoluble in water and so is made by adding to cobalt chloride solution a solution of an oxalate, such as the common laboratory reagent ammonium oxalate. Pink cobalt oxalate is precipitated. Wash this well on the filter and then dry it in the oven.

Stock

Reserve half of the cobalt oxalate for your chemical stock. Put the rest into a crucible and heat it strongly with a bunsen flame, leaving off the crucible lid. The oxalate gives off carbon dioxide and water. When all action has ceased and the crucible contents are red hot, allow the whole to cool. You will find a black powder has been formed. This is one of the oxides of cobalt and has the resounding name of cobaltoso-cobaltic oxide!

A Queer Hobby

WHEN in 1897, the American mariner Captain Joshua Slocum, who was the first man to sail single-handed round the world in a small yacht, called at Pretoria during a spell in South Africa on his way home, he met and dined with the famous President Kruger. The President was much interested in Slocum's feat, but was so bold as to tell him the world was flat! The old sailor, halfway on his journey round the globe, laughed to himself, but said nothing, but Kruger believed he was right. Nor has he been the only South African to hold this out-dated belief. In many of the flat parts of the country

people still cling to the notion that the earth is laid out flat. Inspired by President Kruger's example is one such person, Mr. E. Venter, who himself subscribes to the view of what Rudyard Kipling called the 'geoplanarians'. A resident of Bloemfontein, he has made himself a hobby out of this strange belief, for he collects literature of all kinds—books, tracts, propaganda pamphlets, which set out to prove that the earth is flat. His collection is an impressive one, containing many weird arguments in favour of a flat earth. But obviously Mr. Venter and his fellow-believers are not sailors or airmen! (280)

Odd wood can be cut and shaped for children's BUILDING BRICKS

HUNDREDS of interesting models can be built with the simple and inexpensive set of wooden bricks described below. It will give hours of delight to any boy or girl who is fond of 'making things'.

The materials needed are few, and it is possible to make the set in an evening or two. For the bricks, the writer used two wooden ends of an apple box, costing 3d. A similar one should readily be obtainable from your greengrocer.

The Bricks

Remove the two ends (12ins. by 10ins. by $\frac{3}{4}$ in.), and glasspaper them all over until quite smooth. Then, from one of these pieces, cut twelve lengths, 10ins. by 1in.; and, from the other, six lengths, 10ins. by 1in. Each of the twelve lengths should be cut into 2in. bricks, and each of the six into 1in. bricks. You will then have sixty 2in., and sixty 1in. bricks.

All the bricks should now be given a white undercoating, and, standing on end, allowed to dry. Then apply white paint or enamel.

Roof and Chimney

The roof is formed of two wooden pieces, each 8ins. by 4ins. by $\frac{1}{4}$ in. They

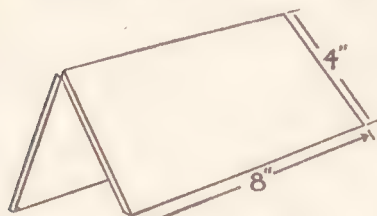


Fig. 1—The roof

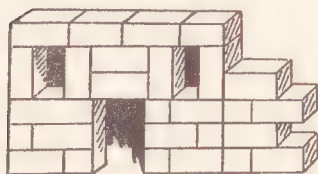


Fig. 4—Making doors and windows

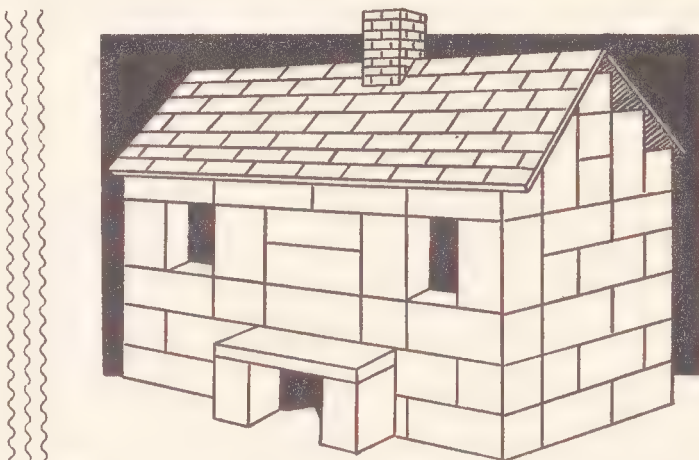
should be fastened together with two small hinges (Fig. 1).

Model Making Building Bricks

Cut another 2in. brick for the chimney, and remove a V-shaped portion, to enable it to rest on the roof, when opened to cover a building (Fig. 2). This chimney and roof are to be painted red.

When dry, dip an artist's brush into Indian ink, and draw lines to represent tiles and bricks.

Three pieces of thick cardboard will be found useful for making floors and ceilings for the buildings. Convenient



sizes are—5ins. by 5ins., 4ins. by 4ins., and 3ins. by 3ins.

Making the Box

A compact box in which to keep the building bricks can easily be constructed. Two strips 10 $\frac{5}{8}$ ins. by 2 $\frac{1}{2}$ ins. by $\frac{1}{4}$ in., nailed to two more strips 12 $\frac{1}{4}$ ins. by 2 $\frac{1}{2}$ ins. by $\frac{1}{4}$ in. form the sides; while the bottom and top portions measure

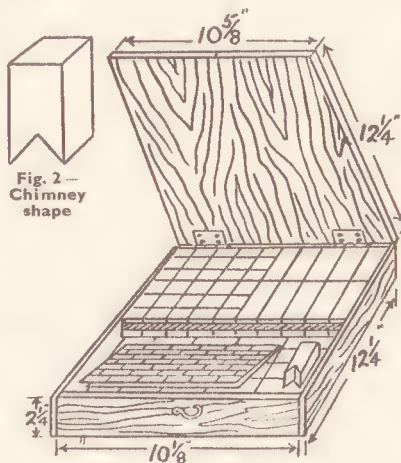


Fig. 3—A suitable container

12 $\frac{1}{4}$ ins. by 10 $\frac{5}{8}$ ins. by $\frac{1}{4}$ in. The top part, forming the lid, should be hinged.

A strip 10 $\frac{5}{8}$ ins. by $\frac{1}{2}$ in. by $\frac{1}{4}$ in., nailed about half way across the box, will keep the bricks neatly together, leaving a space for the roof, ceilings and floors, and chimney. Fix a small hook at the front of the box to fasten the lid securely (Fig. 3).

Doors and Windows

A method of making doors and windows is shown in Fig. 4. For quick assembly, ready-made doors can readily be made with two bricks, each 1 $\frac{1}{2}$ ins. by 1in. by $\frac{3}{4}$ in., over which is nailed another piece 3ins. by $\frac{3}{4}$ in. by $\frac{1}{4}$ in. Windows are similarly formed with two bricks, each 1 $\frac{1}{2}$ ins. by 1in. by $\frac{3}{4}$ in., under and over which are attached pieces each measuring 3ins. by $\frac{3}{4}$ in. by $\frac{1}{4}$ in. (Fig. 5).

If these ready-made doors and windows are to be included, obviously the box

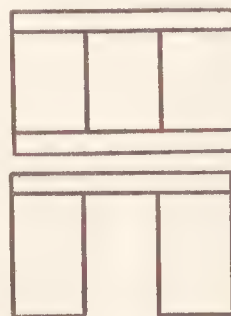


Fig. 5—Window and door construction

will have to be enlarged proportionately.

The interior of a building can be illuminated by placing in it a small electric lamp in a holder, to which is attached a piece of flex connected with a cycle lamp battery.

With this set of bricks a large number of fascinating models can be built—houses, shops, castles, fortresses, towers, and a host of other objects of absorbing interest to young and old alike. (362)

DESIGN FOR MODEL FIRE ENGINE

Materials for making the Model Fire Engine from this week's design, (No. 2888) are available price 6/- from Hobbies Branches; or 6/10 post free from Hobbies Ltd., Dereham, Norfolk.



ON SELLING STAMPS

WE all know that stamp collecting can be a rather expensive matter if one is going to procure all those stamps one wants (excluding, of course, the really rare ones, which would be impossible except for a millionaire). But suppose one considered those stamps as rare if they cost over £10, even then it would be a matter of greater expense than the majority can manage.

Now what is the best way of settling about buying lots of stamps? To buy each separately would add very much to the cost and also it would waste an enormous amount of time.

A much better manner would be to buy them by countries or even by collections, but by doing so we should be bound to gather a great number of duplicates in quite a short time. It is these duplicates that one wants to consider selling. What is the best way of getting rid of them so as to recover some of the money expended on making a good collection?

Three Methods

There are three main methods and each has its special merits. The three ways are, first the sale of single stamps, second the sale of the duplicates as a collection and third by circulation in an exchange club. Suppose we take these methods in turn and consider which will suit what we have for disposal.

The first—single stamps. Well, this method would provide the best return of money, but the disadvantage is this, you will not be able to find a buyer for all your stamps very quickly. Valuable stamps will always find a ready sale at a reasonable price, say, about a quarter to a half of the catalogue price for a good specimen. But the trouble is that it is not the valuable stamps that we want to sell.

The price just mentioned was that which was averaged for stamps at an auction the writer attended recently. Common stamps, say, those of less than 10/- catalogue value, cannot be sold singly at the usual auction.

The only suggestion that one could offer for the sale of those would be to mount them on a sheet of cardboard,

price them and to ask some shopkeeper to put them on sale in his shop. They should only be priced at from a tenth to a quarter of the catalogue value, the higher amount for the more fashionable, such as the British Colonials which are in good condition.

Shopkeeper's Profits

Naturally the shopkeeper will want paying for his trouble. He will most likely ask for a proportion of the takings, and he may or he may not look after the stamps. If for example he exposes them in the sun, then it will spoil quite a lot and they will not then sell. More common stamps should be made up into packets and sold in the same way; that is to ask the shopkeeper to dispose of them.

If the duplicates are mounted in a collection and sold in this way, then you could expect to get a higher price. But there is, of course, quite a lot of work involved, and these days few people have time to spare.

If you do decide to make up a collection of the duplicates, then decide how many stamps you are going to put in the finished collection and buy an album to fit. It is quite unwise to think that a large album with only a few stamps will fetch a big price. A smaller but a better filled album is much more pleasing.

Display

Since you have decided to make a collection, then the stamps must be mounted properly, and in the correct order. That is, as they were issued, with certain spaces left so anyone who purchases will be able to add to the collection as they wish. A mounted collection of, say, 2,000 will fetch very much more than the same stamps placed in an envelope and sealed down.

Unless you know the value of the collection, then it is better to send the stamps to an auctioneer for disposal. Quite a number of people will see them and then they will decide how much they want it and bid against one another for it. In any case it is not likely to go for a very low price, as if it is an exceptional bargain, then others will want it and the price will go up. Just now collections are

making very good prices indeed, particularly if there are a few desirable stamps among the others.

Possibly owing to having some friends or relations in some quarter of the globe, you have a great number of stamps from this region. Then you could make up a collection of stamps from this country and sell as a one-country collection. Again the best way being to send them to an auction.

The Auctions

One disadvantage of sending stamps to an auction is the wait before they are put up for sale. Naturally the auctioneer will require a little while to make up his catalogue, which is something like ten or twelve weeks. But you do learn what the approximate value is and you can place a reserve on the stamps and so avoid their being sold too cheaply.

Exchange Clubs

The third suggestion was by means of an exchange club. Now if you join one of these, this is briefly what happens. You mount the stamps that you have for disposal in a book—frequently these are sold by the club—and you write the price that you want for each stamp above and send the book to the club secretary.

He makes up a parcel of all the books that he has and sends them out to, say, Mr. A, with a list of addresses, so that Mr. A when he has seen them, sends the parcel to Mr. B and so on. Mr. A takes out the stamps that he wants and writes his name in the vacant spaces and sends the money to the club secretary. Mr. B does the same.

Then after the books have gone the round and come back to the secretary, he calculates what amount if any is due to each member and sends this, less a certain percentage which he keeps for expenses. Here again only the good specimens are saleable.

Most clubs are seeking new members, so if you have any fairly good stamps for sale at a fair price, there is no reason why they should not bring back some of the money that has been spent on making a collection.

Punch Ball—(Continued from page 360)

ends of the spring will grip tightly. Alternatively, the ends of the springs can be stapled down on to the dowels, but whichever method is adopted, it is essential that the spring should be perfectly secure.

A simple metal or wooden collar is fitted round the column a few inches below the punch ball, and to the ends of

this, two side guys are fitted. Each guy can consist of two pieces of stout cord connected by a length of spring in the middle. The lower end of each guy will have to be fastened to a small screw-fitting in the floor, but before finally connecting the guy, it will be necessary to adjust the tension so that the ball is properly sprung.

This completes the ball, but a final hint is advisable.

Although a definite length has been given for the column, do not hesitate to cut a piece from it if the ball is found to be too high. The centre of the ball should be at a position where it gets the full benefit of a 'straight left'. (374)

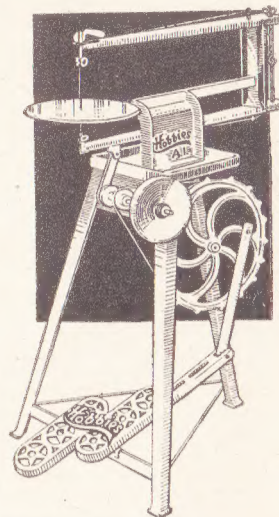
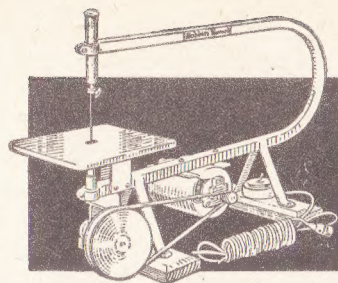


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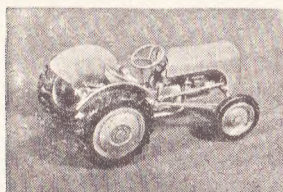
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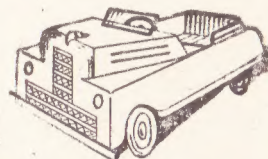
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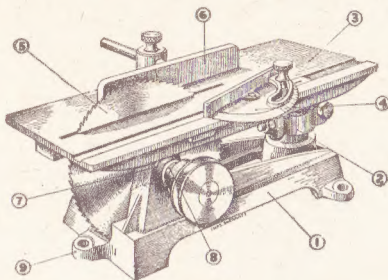
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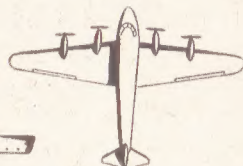
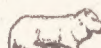
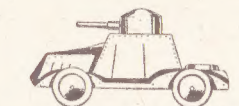
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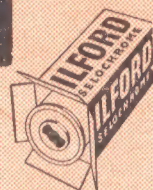
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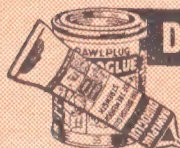
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